CATALOG DOCUMENTATION
REGIONAL ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM - REGION 6
1993-1994 TEXAS COAST RIVERS AND ESTUARIES STUDY
SEDIMENT CHEMISTRY DATA

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1. DATA SET IDENTIFICATION

1.1 Title of Catalog Document

Regional Environmental Monitoring And Assessment Program - Region 6
1993-1994 Texas Coast Rivers And Estuaries Study
Sediment Chemistry Data

1.2 Authors of the Catalog entry

Melissa M. Hughes, OAO Corp.

1.3 Catalog Revision Date

March 31, 1998

1.4 Data File Name

SED_CHEM

1.5 Task Group

Region 6

1.6 Data set identification code

00004

1.7 Version

001

1.8 Requested Acknowledgment

If you plan to publish these data in any way, EPA requires a standard statement for work it has supported:

"Although the data described in this article have been funded wholly or in part by the U. S. Environmental Protection Agency through its R-EMAP Program, it has not been subjected to Agency review, and therefore does not necessarily reflect the views of the Agency and no official endorsement should be inferred."

2. INVESTIGATOR INFORMATION

2.1 Principal Investigator

Charlie Howell
U. S. Environmental Protection Agency - Region 6
Environmental Services Division

2.2 Investigation Participant-Sample Collection

Not applicable

3. DATA FILE ABSTRACT

3.1 Abstract of the Data File

The Sediment Chemistry data file presents a suite of chemical concentrations derived from analyses of a surface sediment sample collected at a station in the south Texas Coast area. Individual and summed analyte concentrations are presented.

A code for each compound is given under ANALYTE. These include inorganics, organics, organic concentration sums, total organic carbon (TOC) and acid volatile sulfides (AVS). Concentrations are recorded in dry weight. Units are reported under a separate attribute, CHMUNITS, as ug/g, ng/g, % or umoles/g. Quality Assurance/Quality Control issues are coded. Depending on the QA code, only a detection limit may be reported.

3.2 Keywords for the Data file

Contaminants, DDT, metals, inorganic analytes, organic analytes, PAH, PCB, pesticides, organophosphates, QA Code, sediment, sediment chemistry, TOC, AVS, TBT, DDT

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The R-EMAP Texas Coast project will:

1. Determine the extent and magnitude of tri-butyltin (TBT) contamination in Galveston Bay sediment and water column.
2. Determine the extent and magnitude of contaminant levels in the fish and sediment of the East Bay Bayou of Galveston Bay and whether the incidence of fish pathologies is correlated with sediment contamination.
3. Determine the levels of chlorinated hydrocarbons in fish tissue, conduct chemical and toxicity tests of sediments and determine benthic community structure in the tidal reaches of the Arroyo Colorado and the Rio Grande Rivers.
4. Determine the extent and magnitude of anoxia and concentrations of agriculture-related contaminants found in the tidal reaches of the Arroyo Colorado and Rio Grande Rivers.

4.2 Data Set Objective

The objective of the Sediment Chemistry data file is to present the concentrations of a suite of analytes and compounds measured from a surface sediment sample collected at a station in the south Texas coast area. The sample was an homogenate composed of the surficial 2 cm from several grabs.

4.3 Data Set Background Information

A full-scale EMAP study was undertaken in the Louisianian Province from 1991-1994 and encompassed the Gulf Coast from northern Florida through Texas. This study, known as EMAP-Estuaries or EMAP-E, generated concerns about contaminants in fish and sediments in several estuaries along the Texas coast. The Region VI R-EMAP project, R-EMAP-TX, is using the EMAP sampling design to address waterbody-specific questions arising from the 1991 EMAP-E study. R-EMAP-TX is focusing on potential problems in several estuarine systems: contaminated sediments in the Galveston Bay estuary, biological impairment (fish pathology and sediment toxicity) in the East Bay Bayou of Galveston Bay, and sediment contamination in tidal reaches of the Arroyo Colorado River and the Rio Grande River.

EMAP monitoring efforts have focused on sediment contaminants rather than measurement of water column contaminants because concentrations of contaminants in sediments are less variable and the sediment integrates contaminant inputs to estuaries over time (i.e., months and years).

Metals in the sediment are derived from anthropogenic sources or from the natural geochemical processes of weathering and erosion of the earth's crust. The difficulty arises in identifying which portion of the total metal content of the sediment was due to natural processes and which was due to human activities.

4.4 Summary of Data Set Parameters

The organic and inorganic compound concentrations measured included: 15 major and trace elements, 27 individual Poly-Aromatic Hydrocarbon (PAH) compounds, 30 pesticides (including DDTs), 25 individual Poly-Chlorinated Biphenyl (PCB) congeners, mono-, di- and tri-butyltin (MBT, DBT, TBT), 1 organophosphate, Total Organic Carbon (TOC) and acid volatile sulfides (AVS). This suite of analytes is similar to that measured in the National Oceanic and Atmospheric Administration's (NOAA) National Status and Trends (NS&T) program. Values in this data file include individual inorganic and organic compound concentrations and concentrations summed for several major groups: total PAHs, Low and High Molecular Weight PAHs, PCBs, DDTs, BHCs and Chlordanes.

Concentrations of all sediment chemistry analytes are reported on a dry weight basis.

4.5 Year-Specific Information about Data

In 1993, sediment chemistry was analyzed by the Geochemical and Environmental Research Group (GERG) at Texas A& M University. In 1993, TOC was analyzed by the Department of Biology at the University of Mississippi and AVS was analyzed by the Chemistry Department at the Gulf Coast Research Lab.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

Collect sediment samples suitable for the analysis of organic and inorganic compounds, TOC and AVS. One sediment sample was expected to be collected at each station.

5.1.2 Sample Collection Method Summary

The grab sampler was lowered through the water column such that travel through the last 5 meters was no faster than 1 m/sec. The grab penetrated the sediment by gravity releasing a trigger allowing the jaws to close. When the grab was pulled from the sediment using the winch, the jaws closed, encapsulating the sediment sample. The chance of sampling the exact same location twice was minimized. After three grabs were taken, the boat was moved five meters downstream by letting out the appropriate length of anchor line.

Stainless steel utensils were used to remove the top two cm of sediment from a grab. The sediment was removed to a stainless steel bowl and placed in a cooler of ice to remain cold, but unfrozen. The grab sampler was rinsed and re-deployed. This procedure was repeated until approximately 3,000 cc of sediment was collected. The sediment was mixed by hand until thoroughly homogenized, and aliquots were placed immediately into pre-cleaned glass jars (for organics) or plastic containers (for inorganics and AVS). The samples were immediately stored on ice following collection. The remainder of the sediment was split between grain size and sediment toxicity samples.

5.1.3 Beginning Sampling Dates

24 September 1993
10 August 1994

5.1.4 Ending Sampling Date

10 October 1993
16 August 1994

5.1.5 Platform

A team was supplied with a 25-foot SeaArk work boat equipped with a 7.5 L gas engine fitted with a Bravo outdrive, an "A" frame boom assembly and hydraulic winch. On-board electronics consist of: a Loran C unit, GPS, radar unit, 2 VHF radios, cellular phone, compass, a depth finder, a tool kit, and all required and suggested safety equipment.

5.1.6 Sampling Equipment

A 1/25 m2, stainless steel, Young-modified Van Veen Grab sampler was used to collect sediment grabs for benthic analyses. This grab sampled an area of 413 cm2 with a maximum depth of penetration in the sediment of 10 cm.

5.1.7 Manufacturer of Sampling Equipment

Values were not measured at time of collection.

5.1.8 Key Variables

All

5.1.9 Sampling Method Calibration

The sampling gear did not require any calibration. It required inspection for deformities incurred due to mishandling or impact on rocky substrates.

5.1.10 Sample Collection Quality Control

Field technicians were trained to follow Standard Operating Procedures to insure the collection of representative, uncontaminated and high quality samples. QA/QC measures were taken in the field to avoid or reduce contamination and insure the collection of representative samples. These included: use of stainless steel instruments, thorough cleaning of the sampler between grabs and use of pre-cleaned containers for sediment storage.

A successful grab had relatively level, intact sediment over the entire area of the grab and a sediment depth of 7-10 centimeters. Unacceptable grabs included those: containing no sediments, which were partially filled or had shelly substrates or grossly slumped surfaces. Grabs completely filled to the top, where the sediment was oozing out of the hinged top, were also unacceptable.

Additionally, each crew was visited during the sampling period by the QA Coordinator or Logistics Coordinator. Part of the review included observing sample collection procedures to ensure samples were being processed properly.

5.1.11 Sample Collection Method References

Macauley, J.M. 1991. Environmental Monitoring and Assessment Program-Near Coastal Louisianian Province: 1991 Monitoring Demonstration. Field Operations Manual. EPA/600/X-91/XXX. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

Macauley, J.M. 1992. Environmental Monitoring and Assessment Program: Louisianian Province: 1992 Sampling: Field Operations Manual. EPA/ERL-GB No. SR-119. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratory, Gulf Breeze, FL 32561.

5.1.12 Sample Collection Method Deviations

None

5.2 Data Preparation and Sample Processing

5.2.1 Sample Processing Objective

Process sediment samples for characterization of contaminants.

5.2.2 Sample Processing Methods Summary

Upon receipt at the laboratory, the samples were frozen pending analysis. The frozen sediment samples were thawed and thoroughly homogenized prior to analysis. Separate aliquots of the homogenized sediment were removed. The aliquots were processed for several types of chemical analyses. These included: inorganic analyses (major and trace elements); butyltins (MBT, TBT and DBT)); organic analyses (PAHs, PCBs, aliphatic hydrocarbons, and pesticides); total organic carbon (TOC); and acid volatile sulfides (AVS).

5.2.2.1 Inorganic Analytes

Analysis of the sediment for major and trace elements involved a total digestion (i.e., complete dissolution) of the sediment matrix using HNO3/HC1O3 in pressurized Teflon bombs heated at 130 degrees F (conventional oven) followed with additions of HF. Instrument analysis for metals Al, Cu, Fe, Mn, and Zn was by flame atomic absorption (FAA); for metals Ag, As, Cd, Cr, Ni, Pb, Se and Sn, graphite furnace atomic absorption (GFAA); and for mercury (Hg), cold vapor atomic absorption.

Sediment concentrations of butyltin compounds were determined using high resolution gas chromatography and flame photometric detection.

5.2.2.2 Organic Analytes

The analysis of organic contaminants involved extraction and cleanup followed by instrumental analysis. This included the following basic steps: Soxhlet extraction with methylene chloride, extract drying using sodium sulfate, extract concentration using Kuderna-Danish apparatus, removal of elemental sulfur with activated copper, removal of organic interferents with silica gel/alumina column purification. Following extraction and cleanup, PAH compounds were analyzed using gas chromatography/mass spectrometry (GC/MS).
The pesticides and PCB congeners were analyzed using gas chromatography/electron capture detection (GC/ECD).

5.2.2.3 Other Analytes

The concentration of total organic carbon (TOC) in each sediment sample was determined by TOC analyzer using combustion/non-dispersive infrared gas analysis. Acid volatile sulfides (AVS) were measured using a sulfide ion-specific electrode following reaction of the sediment with hydrochloric acid and subsequent trapping of the evolved hydrogen sulfide in solution.

5.2.3 Sample Processing Method Calibration

N/A

5.2.4 Sample Processing Quality Control

N/A

5.2.5 Sample Processing Method Reference

U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual - Estuaries, Volume 1: Biological and Physical Analyses. United States Environmental Protection Agency, Office of Research and Development, Narragansett, RI. EPA/620/R-95/008.

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Value

Not applicable

6.2 Data Manipulation Description

Not applicable

6.3 Data Manipulation Examples

Not applicable

7. DATA DESCRIPTION

7.1 Description of Parameters

Field Name	Data Type	Field Len	Format	Variable Field Label
STA_NAME	Char	8	8.	The Station Identifier
VST_DATE	Num	8	YYMMDD6.	The Date the Sample was Collected
ANALYTE	Char	8	8.	Analyte Code
CONC	Num	13	13.6	Conc. of Analyte (dry wt.) Units
CHMUNITS	Char	12	12.	Concentration
TOT_ANAL	Num	8	12.	Analytes (#) in Summed Conc.
QA_CODE	Char	15	15.	Quality Assurance Code for Data
DETLIMIT	Num	13	13.6	Method Detection Limit for Analyte

7.1.6 Precision to which values are reported

The sediment chemistry concentrations presented are in a format of 6 decimal places. This format is necessary because some concentrations are in ug/g and some concentrations are in ng/g. However, the concentrations are only valid FOR THREE SIGNIFICANT FIGURES (not necessarily three decimal places), e.g., 345.67 ug/g is 346 ug/g but 0.00235 ng/g remains as 0.00235 ng/g.

7.1.7 Minimum/Maximum Value in Data Set for CONCENTRATION

CONC

ANALYTE	MINIMUM	MAXIMUM
ACENTHE	0.10	116.60
ACENTHY	0.10	80.50
AG	0.05	0.38
AL	6510.00	94400.00
ALDRIN	0.13	9.69
ALPHABHC	0.12	0.15
ALPHACHL	0.10	1.00
ANTHRA	0.10	360.10
AS	1.20	13.00
AVS_CON	0.03	19.00
BENANTH	0.10	1312.30
BENAPY	0.10	1198.90
BENEPY	0.20	868.30
BENZOBFL	0.20	1968.60
BENZOKFL	0.20	626.80
BENZOP	0.20	729.20
BETABHC	0.10	0.60
BHC_TOT	0.10	1.00
BIPHENYL	0.20	166.50
C1CHRYS	0.90	152.30
C1DIBENZ	0.10	8.90
C1FLRAN	1.60	164.40
C1FLUOR	0.10	10.00
C1NAPH	0.40	18.30
C1PHENAN	0.10	44.20
C2CHRYS	1.00	197.30
C2DIBENZ	0.70	40.90
C2FLUOR	1.30	38.50
C2NAPH	0.90	48.30
C2PHENAN	1.30	233.70
C3CHRYS	0.60	27.10
C3DIBENZ	0.30	67.10
C3FLUOR	0.10	97.70
C3NAPH	0.10	69.50
C3PHENAN	1.00	295.40
C4CHRYS	2.80	9.00
C4NAPH	2.80	48.10
C4PHENAN	1.90	178.70
CD	0.01	8.90
CHL_TOT	0.10	22.48
CHRYSENE	0.20	1286.40
CISNONA	0.10	0.60
CR	4.10	79.20
CU	2.30	57.80
DBT	0.10	19.00
DDD	0.10	1.70
DDE	0.10	47.40
DDT	0.10	4.39
DDT_TOT	0.10	50.30
DELTABHC	0.10	0.10
DIBENZ	0.10	214.80

7.1.7 Minimum/Maximum Value in Data Set for CONCENTRATION, cont.
CONC

ANALYTE	MINIMUM	MAXIMUM
DIBENZO	0.10	2.60
DICOFOL	0.91	6.34
DIELDRIN	0.10	0.40
DIMETH	0.10	86.20
ENDOSUL1	.	.
ENDOSUL2	0.12	0.70
ENDRIN	0.10	5.48
FE	1100.00	40020.00
FLUORANT	0.30	2226.20
FLUORENE	0.10	249.20
GAMMACHL	0.10	1.30
HEPTACHL	0.14	21.98
HEPTAEPO	0.10	0.70
HEXACHL	0.10	2.02
HG	0.00	0.51
INDENO	0.10	883.10
LINDANE	0.10	0.40
MBT	0.04	16.00
MENAP1	0.20	24.20
MENAP2	0.10	62.70
MEPHEN1	0.10	89.00
MIREX	0.15	1.23
MN	9.00	1255.00
NAPH	0.40	31.30
NI	1.40	33.80
OPDDD	0.10	0.30
OPDDE	0.10	0.75
OPDDT	0.10	0.50
OXYCHL	0.15	0.15
OXYFL	0.13	0.73
PAHTOT_L	6.10	1884.90
PAH_HMW	3.00	13321.80
PAH_LMW	0.20	2157.30
PAH_TOT	3.20	15479.10
PB	2.51	50.94
PCB101	0.10	5.38
PCB105	0.10	1.71
PCB110	0.40	1.00
PCB118	0.10	4.34
PCB126	0.13	0.70
PCB128	0.10	7.70
PCB138	0.10	25.00
PCB153	0.10	4.41
PCB170	0.10	4.10
PCB18	0.14	0.60
PCB180	0.10	2.29
PCB187	0.100	1.94
PCB195	0.100	0.96
PCB200	0.120	0.56
PCB206	0.100	1.01
PCB209	0.100	1.30
PCB28	0.100	5.30

7.1.7 Minimum/Maximum Value in Data Set for CONCENTRATION, cont.

CONC

ANALYTE	MINIMUM	MAXIMUM
PCB29	.	.
PCB44	0.100	1.21
PCB52	0.100	2.41
PCB66	0.100	0.70
PCB77	0.300	0.42
PCB8	0.100	1.00
PCB87	0.250	3.06
PCBTOT_L	0.100	33.74
PCB_TOT	0.100	33.74
PERYLENE	0.300	376.30
PHENANTH	0.200	1048.80
PPDDD	0.100	1.40
PPDDE	0.100	46.90
PPDDT	0.100	4.39
PYRENE	0.400	1764.60
SB	0.030	1.53
SE	0.010	0.88
SN	-0.130	4.76
TBT	0.071	170.00
TNONCHL	0.100	1.00
TOC	0.140	2.63
TOXAPHEN	.	.
TRIMETH	0.200	24.70
ZN	12.400	802.20

7.1.8 Minimum/Maximum Value in Data Set for DETECTION LIMIT

DETLIMIT

ANALYTE	MINIMUM	MAXIMUM
ACENTHE	0.35	4.50
ACENTHY	0.35	3.70
AG	.	.
AL	.	.
ALDRIN	0.16	0.35
ALPHABHC	0.20	0.35
ALPHACHL	0.23	0.35
ANTHRA	0.35	4.10
AS	1.40	1.40
AVS_CON	0.22	0.22
BENANTH	0.35	1.40
BENAPY	0.35	1.20
BENEPY	0.35	2.40
BENZOBFL	0.35	1.80
BENZOKFL	0.35	1.90
BENZOP	0.30	0.35
BETABHC	0.20	0.20
BHC_TOT	0.35	0.35
BIPHENYL	0.35	2.40
C1CHRYS	2.00	2.00
C1DIBENZ	1.60	1.60

7.1.8 Minimum/Maximum Value in Data Set for DETECTION LIMIT, cont.

DETLIMIT

ANALYTE	MINIMUM	MAXIMUM
C1FLRAN	12.40	12.40
C1FLUOR	10.00	10.00
C1NAPH	2.00	2.00
C1PHENAN	16.40	16.40
C2CHRYS	2.00	2.00
C2DIBENZ	1.60	1.60
C2FLUOR	10.00	10.00
C2NAPH	2.00	2.00
C2PHENAN	16.40	16.40
C3CHRYS	2.00	2.00
C3DIBENZ	1.60	1.60
C3FLUOR	10.00	10.00
C3NAPH	2.00	2.00
C3PHENAN	16.40	16.40
C4CHRYS	2.00	2.00
C4NAPH	2.00	2.00
C4PHENAN	16.40	16.40
CD	.	.
CHL_TOT	0.35	0.35
CHRYSENE	0.35	0.50
CISNONA	0.10	0.35
CR	.	.
CU	.	.
DBT	0.22	5.00
DDD	0.35	0.35
DDE	0.35	0.35
DDT	0.35	0.35
DDT_TOT	0.350	0.350
DELTABHC	0.200	0.200
DIBENZ	0.350	2.800
DIBENZO	0.400	0.400
DICOFOL	0.350	0.350
DIELDRIN	0.160	0.350
DIMETH	0.350	2.400
ENDOSUL1	0.350	0.350
ENDOSUL2	0.350	0.350
ENDRIN	0.250	0.350
FE	.	.
FLUORANT	0.350	0.400
FLUORENE	0.350	2.500
GAMMACHL	0.230	0.350
HEPTACHL	0.200	0.350
HEPTAEPO	0.160	0.350
HEXACHL	0.350	0.370
HG	0.007	0.007
INDENO	0.350	1.600
LINDANE	0.200	0.350
MBT	0.220	5.000
MENAP1	0.350	0.800
MENAP2	0.350	0.800
MEPHEN1	0.350	0.600
MIREX	0.170	0.350

7.1.8 Minimum/Maximum Value in Data Set for DETECTION LIMIT, cont.

DETLIMIT

ANALYTE	MINIMUM	MAXIMUM
MN	.	.
NAPH	0.350	0.350
NI	.	.
OPDDD	0.130	0.350
OPDDE	0.280	0.350
OPDDT	0.250	0.350
OXYCHL	0.200	0.350
OXYFL	0.350	0.350
PAHTOT_L	.	.
PAH_HMW	0.350	0.350
PAH_LMW	0.350	0.350
PAH_TOT	0.350	0.350
PB	.	.
PCB101	0.130	0.350
PCB105	0.100	0.350
PCB110	0.240	0.240
PCB118	0.120	0.350
PCB126	0.180	0.350
PCB128	0.130	0.350
PCB138	0.180	0.350
PCB153	0.120	0.350
PCB170	0.350	0.810
PCB18	0.250	0.350
PCB180	0.160	0.350
PCB187	0.14	0.35
PCB195	0.25	0.35
PCB200	0.35	0.35
PCB206	0.09	0.35
PCB209	0.35	0.78
PCB28	0.09	0.35
PCB29	0.35	0.35
PCB44	0.09	0.35
PCB52	0.09	0.35
PCB66	0.14	0.35
PCB77	0.35	0.35
PCB8	0.08	0.35
PCB87	0.35	0.35
PCBTOT_L	0.35	0.35
PCB_TOT	0.35	0.35
PERYLENE	0.35	3.30
PHENANTH	0.35	0.50
PPDDD	0.25	0.35
PPDDE	0.35	0.85
PPDDT	0.24	0.35
PYRENE	0.35	3.10
SB	0.10	0.17
SE	0.10	0.10
SN	0.15	0.15
TBT	3.19	5.00
TNONCHL	0.10	0.35
TOC	0.22	0.22
TOXAPHEN	0.35	0.35
TRIMETH	0.35	2.40
ZN	.	.

7.2 Data Record Example

7.2.1 Column Names for Example Records

STA_NAME DATE ANAL CONC UNIT QA DETLMT TOT_ANAL

7.2.2 Example Data Records

STA_NAME	DATE	ANAL	CONC	UNIT	QA	DETLMT	TOT_ANAL
LA93AC1	931007	ACENTHE	0.400000	ng/g	CH-B	4.500000	.
LA93AC1	931007	ACENTHY	0.400000	ng/g	CH-B	3.700000	.
LA93AC1	931007	AG	0.109000	ug/g		.	.
LA93AC1	931007	AL	58893.000000	ug/g		.	.
LA93AC1	931007	ALDRIN	.		CH-A	0.160000	.

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-97 Degrees 36 Minutes 16.20 Decimal Seconds

8.2 Maximum Longitude

-94 Degrees 24 Minutes 33.00 Decimal Seconds

8.3 Minimum Latitude

25 Degrees 57 Minutes 28.80 Decimal Seconds

8.4 Maximum Latitude

29 Degrees 43 Minutes 49.80 Decimal Seconds

8.5 Name of area or region

Coastal distribution of sampling is in Galveston Bay, the East Bay Bayou of Galveston Bay and the Arroyo Colorado and the Rio Grande River systems in Texas.

9. QUALITY CONTROL AND QUALITY ASSURANCE

Because of the complexity and importance of sediment contaminant data, EMAP has expended a tremendous effort in the Quality Assurance of these data as is reflected in the detail provided in this section.

9.1 Measurement Quality Objectives

Measurement Quality Objectives (MQOs) for R-EMAP Texas sediment chemistry analyses were defined in the Louisianian Province Quality Assurance Project Plan. This plan required each laboratory to analyze the following quality control (QC) samples along with every batch or "set" of field chemistry samples: laboratory reagent blank, calibration check standards, laboratory fortified sample matrix, laboratory duplicate, and Laboratory Control Material (LCM). Results for these QC samples had to fall within certain pre-established control limits.

9.1.1 Sample Processing Method Calibration

For the sediment analyses, a Standard or Certified Reference Material (SRM or CRM) typically was used as the Laboratory Control Material (LCM). SRMs and CRMs have known or "certified" concentrations of the analytes being measured and therefore, are useful for assessing both accuracy and precision. The QA Plan required the laboratory's percent recovery (relative to the certified concentration in the reference material) to fall within the range of 80 to 120 % for each inorganic analyte and 65 to 135 % for each organic analyte. If the laboratory consistently failed to meet these accuracy goals for the CRM or SRM, the values reported for the failed analytes were considered to be suspect and were flagged.

9.1.2 Sample Processing Quality Control

Each laboratory was required to analyze the following quality control (QC) samples along with every batch or "set" of field chemistry samples: laboratory reagent blank, calibration check standards, laboratory fortified sample matrix, laboratory duplicate and Laboratory Control Material (LCM). Results for these QC samples had to fall within certain pre-established control limits for the analysis of a batch of samples to be considered acceptable.

9.2 Quality Assurance/Quality Control Methods

If results for these QC samples did not fall within certain pre-established control limits, the analysis of a batch of samples was not considered acceptable. These and other quality control issues are coded in four data qualifier codes (QA_CODE) or "flags" used in the Texas coast sediment chemistry data file:

CH-A CODE

The "CH-A" code indicates that an analyte was not detected. When the "CH-A" code is used, the concentration field is left blank and the method detection limit for the analyte in that particular sample is reported under DETLIMIT.

CH-B CODE

It is sometimes possible for a laboratory to detect an analyte and report its concentration at a level which is below the calculated method detection limit for the sample. In these situations, the analyst is confident that the analyte was present in the sample, but there is a high degree of uncertainty in the reported concentration. The "CH-B" code is used to flag reported values which are below the calculated method detection limit for the sample. Such values are considered estimates only and should be used with discretion.

CH-C

The CH-C code indicates that the laboratory routinely failed to meet one or more of the QC requirements and the data are unacceptable for use in the EMAP assessments.

CH-E

The CH-E code indicates that the laboratory experienced minor deficiencies meeting the QC requirements, but the overall data quality is judged to be reliable for EMAP assessments.

CH-I CODE

Some analytes are difficult to quantify because they co-elute with other closely related analytes. This phenomenon is called "matrix interference". When this occurs, the suspect analyte(s) are given a "CH-I" code and concentration is left blank.

CH-X CODE

In favor of expediency, a laboratory may elect to cease reporting some of the analytes. EMAP protocol only requires that the laboratory analyze a given list of chemicals; when they go beyond this list and report additional chemicals, we include them in our data. The "CH-X" code indicates that an analyte has been excluded from a given set of data.

Only "unflagged" or CH-E coded values are considered valid and useful for most assessment purposes.

9.3 Actual Measurement Quality

Results of QC sample analyses are stored in the R-EMAP Texas database and are available upon request.

9.3.1 Major and trace metals analyses

The analysis of major and trace metals by FAA and GFAA spectrophotometry (cold vapor AA for mercury) consistently met the pre-established acceptability criteria (control limits) for the QC samples (e.g., calibration check samples, laboratory reagent blanks, matrix spikes, and Certified Reference Materials, CRMs). No qualifier codes were issued for this data file and the 1991-93 sediment metals data were deemed acceptable for use.

9.3.2 Organic contaminants analyses

Sediment organic chemistry data for 1991-93 South Texas coast Monitoring met the overall performance-based QA/QC requirements and quality criteria. Results for reagent blanks and calibration check samples analyzed with each batch of samples generally fell within control limits and serve to verify that sample contamination did not occur and that all instruments were calibrated properly throughout the analytical runs. Recovery efficiencies based on the analyses of certified reference materials and matrix spike samples demonstrated that both accuracy and precision goals were achieved for most analytes.

For both the PAH and PCB/pesticide analyses, SRM 1941a (Organics in Marine Sediment, issued by the National Institute of Standards and Technology, NIST) was analyzed as the Laboratory Control Material along with each batch of field samples from the 1993 monitoring. For most of the individual PAH compounds and PCB/pesticide analytes with known concentrations in the SRMs (this includes both "certified " and "non-certified" values), the average percent recovery achieved by the laboratory generally fell within the control limit range of 65% to 135%. Whenever the laboratory failed to consistently achieve these recovery rates for a particular compound, all the results in that year's data file for that compound were flagged with the "CH-C" code to signify the potential inaccuracy inferred from the SRM analysis. Data flagged with the CH-C code are judged to be unreliable and were not used in EMAP-Louisianian Province assessments; they are included as estimates, only, and data users are admonished to that effect. A second qualifier, the "CH-E" code, was assigned in certain cases where minor QC deficiencies were noted and the data quality, although marginal, remained qualified for use in EMAP assessments; again, the user is warned in their particular use of these coded data. It is important to note that the 65% to 135% recovery criteria only applies to compounds having SRM concentrations greater than 10 times the laboratory's MDL. The following sections discuss qualification of sediment organic chemistry data on a year-by-year basis.

1993 Organics (based on SRM 1941a)

Dieldrin (organochlorine pesticide) - CH-C, rejected. SRM recoveries marginally acceptable, but, based on laboratory's previous high bias and frequency of "hits" observed in field sample results, these data are judged unreliable.

Biphenyl (PAH) - CH-C, rejected. SRM recoveries consistently indicated bias toward underestimating true value.

Alkanes: C13, C14 C15, C16, C20, and C26 (aliphatic hydrocarbons) - CH-E, marginally acceptable. SRM recoveries indicated bias toward underestimating (~40%) true values, however, these SRM values are "non-certified" and should be only considered as estimates; matrix spike recoveries - good..

PCB 110/77 - CH-C, rejected. SRM recoveries consistently indicated bias toward overestimating true value.

PCB 170 - CH-C, rejected. SRM recoveries consistently indicated high bias (5-6X) toward overestimating the true value; high degree of variability (CV of 64%).

PCB 206 - CH-E, marginally acceptable. SRM recoveries indicated bias toward underestimating true value, however, matrix spike recoveries-good; moderate degree of variability (CV of 50%).

PCB 209 - CH-E, marginally acceptable. SRM recoveries indicated bias toward underestimating true value, however, matrix spike recoveries - good; variability - good (CV of 30%).

All other PAH and PCB/pesticide analytes were deemed acceptable without further qualification and were included in the 1993 data.

Toxaphene was only detected as present or absent without quantification. CHMUNITS="Y/N" for this organic analyte and the CONC = "1" is toxaphene was present or "0" if no toxaphene was present in the sample.

9.3.3 Total Organic Carbon (TOC) analyses

All QC results for the analysis of TOC in sediment for the 1991-93 south Texas coast met the required quality criteria. The Certified Reference Material BCSS-1 (standard marine sediment) supplied by the National Research Council of Canada was analyzed with each batch of 10 samples; also, along with each sample batch, a duplicated sample and a blank were included. For all three years, percent recovery of TOC from the CRM consistently remained >95% and the relative percent difference for duplicate analyses remained <6%; laboratory blanks showed no significant contamination. All sediment TOC data for 1991-93 were deemed acceptable for use without qualification.

9.3.4 Butyltin analyses

The QC data for the analysis of butyltin in sediment for the 1993-94 south Texas coast monitoring consistently met the required quality criteria for accuracy and precision. The average percent recovery was within 70% to 130% of the certified values for MBT, DBT, and TBT in the Certified Reference Material BCSS-1 (standard marine sediment) issued by the National Research Council of Canada; recovery rates for the three years averaged; TBT-93%, DBT-81%, and MBT-104% (n=46) with CVs remaining <12%. All butyltin data for 1991-93 were deemed acceptable for use without qualification.

9.3.5 Acid volatile sulfides (AVS)

The QC data for the analysis of AVS in sediment for the 1993-94 south Texas coast consistently met the required quality criteria for accuracy and precision. The percent recovery of sulfide for calibration check standards, laboratory fortified blanks, and laboratory fortified matrix samples routinely fell within 85% to 115% of the known concentration; the relative percent difference between duplicate samples routinely met the control limit of # 20%. All sediment AVS data for 1991-93 were deemed acceptable for use without qualification.

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the WWW site.

10.2 Data Access Restrictions

Data can only be accessed from the WWW site.

10.3 Data Access Contact Persons

Charles Howell
U.S. EPA - Region 6
Environmental Services Division
(214) 655-8354

10.4 Data file Format

Data can be downloaded as ASCII fixed format files.

10.5 Information Concerning Anonymous FTP

Not accessible

10.6 Information Concerning WWW

Data can be downloaded from the WWW

10.7 EMAP CD-ROM Containing the Data file

Data not available on CD-ROM.

11. REFERENCES

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12. TABLE OF ACRONYMS

ACRONYM	DESCRIPTION
EMAP	Environmental Monitoring and Assessment Program
EPA	Environmental Protection Agency
FTP	File Transfer Protocol
GPS	Global Positioning System
REMAP	Regional Environmental Monitoring and Assessment Program
WWW	World Wide Web

13. PERSONNEL INFORMATION

Charlie Howell
U.S. Environmental Protection Agency
Region 6, Environmental Services Division
First Interstate Bank Tower at Fountain Place
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733
(214) 655-8354
howell.charlie@epamail.epa.gov

Melissa M. Hughes
EMAP-Information Management
OAO Corp. c/o U.S. EPA NHEERL-AED
27 Tarzwell Drive
Narragansett, RI 02882-1197
(401) 782-3184 (Tele)
(401) 782-3030 (FAX)
hughes.melissa@epa.gov